sensory and motor activities on the lowest levels and perception and learnt actions on a slightly higher level; the more complex "symbolic" operations include such activities as imaginative reproduction, language, conception, judgment and reasoning.

The classification to which he is thus led is, as he himself recognizes, closely in keeping with the conclusions of those British writers who, from Galton onwards, have adopted a statistical approach to the problems with which he deals—the so-called factorist school. He cites more particularly the views of Spearman, who followed Spencer in insisting on a complete continuity among all cognitive processes and in giving intelligence the supreme if not the sole part to play in all such activities. I fancy, however, that Professor Piaget's own theory comes closer still to that of other factorists, who followed Galton's lead and recognized not only a central factor of intelligence but also a hierarchy of more specialized abilities differentiating out of it (a point which Spearman denied). His view that intelligent behaviour depends, not as Spearman and Spencer's other followers maintained, on mere discrimination, but on a structural organization, also agrees more with the results of recent factorial work than with the view originally put forward by Spearman and the earlier followers of Herbert Spencer.

The whole volume forms an admirable survey of its subject, and at the same time provides a clear and attractive statement of the conclusions to which Professor Piaget's own investigations have eventually led him. He believes, with some justice, that his eclectic theory may serve in large measure to reconcile and synthesize the narrower doctrines put forward by the rival Continental theorists—the behaviourists, the Gestaltists, the thought-psychologists, and those who would introduce purposive or teleological principles. His book is perhaps one for the specialist rather than the general reader. But his penetrating summary of the literature, and his own suggestive arguments, should be studied by all who are contemplating work in this field.

CYRIL BURT.

Stouffer, Samuel A., and others. *Measurement and Prediction.* Princeton, 1950. Princeton University Press. Pp. 756. Price $10.00.

THIS is the fourth volume of Studies in Social Psychology in World War II, the first three of which were reviewed together in a previous number (p. 166). It describes in detail the researches which formed the basis of some of the observations made in these three volumes, and attempts to analyse the problems first of measurement and then of prediction.

In the first part of the book considerable thought is given to the rôle of questionnaire research in attitude and opinion measurement; and scale analysis, which provides a rank order for individuals being questioned, is regarded as valuable. The conditions under which scales vary are fully discussed, and obviously every attempt is made to subject these hypotheses and methods to the most rigorous tests. This section will be of extreme interest to all concerned in the production of questionnaires and will give them much food for thought, though many—even those whose mathematics are adequate—may find that the arguments are set out without conciseness, and that consecutive reasoning is somewhat obscured by divergent ideas.

The second part of the book, on prediction, is open to more criticism. Again there is—to English standards of paper economy—an almost incredible wealth of descriptive detail, hampered by cumbersome and ill-assorted terms. We are given the account of the tests used for screening psychoneurotics and for studying soldiers' post-war plans. The value of both procedures is now generally accepted; but the account given here may paradoxically give some ammunition to old opponents; for the reader, a little bemused perhaps by the profusion, is rewarded just before he gets to page 700 by hearing that "considerable support is given to Dollard's common-sense statement that a man will best predict what he will do in a future situation if he has been in about the same situation before." But the writers want to

do more than support common sense, and they point out that it isn't enough to say that " people will do what they said if they don't change their minds first "—a phrase which is so refreshingly clear that one starts with joy, only to be told that this " carries also the implication that once the individual has stated his intentions, he remains in this respect static unless some crucial experience leads him to change his intentions." The crux of the question, what constitutes cruciality, is in any case ignored.

Finally, we do not know if any record was made of any validation of these predictions by observation of results; what did the returning soldiers go to ? It is now five years later—and some work may have taken place.

R. F. T.

Vernon, P. E. *The Structure of Human Abilities.* London, 1950. Methuen and Co. Pp. viii + 160. Price 12s. 6d.

PROFESSOR VERNON'S aim has been to bring together into a single survey the main results so far established by the statistical techniques which psychologists term " factor analysis." " At first sight," he says, " publications in this field appear to give contradictory and confusing accounts of mental structure." But, as he shows without great difficulty, the more trustworthy conclusions can readily be " fitted into one consistent, if incomplete, picture." Its outlines fully conform with what is called the ' hierarchical theory '—the theory, he explains, " to which this book is committed."

His first two chapters are chiefly historical, and describe the chief " landmarks in the development of factor theory." He starts with the traditional doctrine of mental faculties, and points out its scientific weaknesses. Though based on little more than casual observation and unchecked speculation, faculty psychology, together with the psychology of types, " still permeates educational theory and practice at the present day," greatly befogging work on guidance and personnel selection. In its place he substitutes what earlier writers called a hierarchical scheme of mental abilities—a mode of classification which a statistical analysis, he believes, has now amply verified.

" The hierarchical theory," he explains, " was first put forward by Burt, under the influence of McDougall " ; and he refers his readers to a recent article of mine on " alternative methods of factorial analysis." I should prefer them to turn rather to my previous papers on " The Structure of the Mind " in the *Brit. J. Educ. Psych.* (XIX, pp. 100 *et seq.*), where, as the subtitle indicates, an attempt was made to review the " Results of Factor Analysis " up to date. Although he regards a " strict hierarchical picture " as an over-simplification (with which I should heartily agree), he fully accepts the main underlying ideas and briefly outlines their nature. Instead of treating factors as causal " faculties," localized in definite centres of the brain (the general factor of intelligence, for instance, being localized in the frontal lobes and the verbal factor in the speech-centre), the so-called hierarchical theory considers them, in the first instance, to be no more than principles of classification : thus the verification of a general cognitive " factor " merely means that all the processes or test-performances which have positive correlations with that factor belong to one general class or *genus*, which may be termed " cognition." Within this broad generic class we then find narrower subclasses or *species* of ability; their actual groupings are revealed by " specific " factors. Each species can, as a rule, be subdivided still further into subspecies, and so on, in accordance with what logicians call a " hierarchical scheme "—that is, a scheme which represents narrower groups as differentiating out of the broader by a kind of branching pedigree. As will easily be realized, this conception of mental abilities has been chiefly favoured by evolutionary psychologists, such as Herbert Spencer and his followers.

What Professor Vernon calls " the empirical approach "—the attempt to study the whole problem in a rigorously objective manner, with the aid of standardized tests and statistical techniques—begins with Galton. Galton, it may be remembered, con-